

## Three Bay System Subwatershed Barnstable, Cape Cod, Massachusetts

The Three Bay System Subwatershed is located in Barnstable and Sandwich. It has an area of 12,752 acres. The system includes Marstons Mills River, North Bay, West Bay, and Cotuit Bay as well as smaller coves such as Prince's and Warren's Coves. Barnstable Land Trust and the Massachusetts Audubon Society have preserved areas along the Marstons Mills River. There are two herring runs on this river. One terminates in Middle Pond and the other in Santuit Pond. Like many of the coastal embayments, public beaches abound in both fresh and saltwater.

Several parts of the system are experiencing alarmingly high levels of nitrogen and fecal coliform, according to Three Bays Preservation, Inc. In the Fall 2001, parts of North Bay and Prince's Cove experienced red tide caused by *cochlodinium polykrikoides*. No fish kills were noted.

The Three Bays/Centerville Harbor area was designated a No Discharge Area by the state. The discharge of all boat wastewater, even if it has been treated, is prohibited. A study using DNA testing found that human waste accounts for more than half the pollutants in the south end of Warren's Cove and 43 percent in the northern section of Prince's Cove.

In 2000, the former Cape Cod Watershed Team requested that the Three Bay System and Lovell's Pond in Marstons Mills be added to the Massachusetts 303(d) List of Impaired Waterbodies.

Past oil, fuel, chemical, and hazardous waste disposal activities on the Massachusetts Military Reservation have created ground water pollution plumes, one of which is projected to flow into this watershed. The Air Force Center For Environmental Excellence (AFCEE) is investigating and addressing this groundwater pollution.

Dead Neck/Sampson's Island is an important piping plover breeding area, in 2000 reporting the second highest productivity rate in the entire state.

Most areas in this subwatershed are serviced by municipal water, but there are no municipal sewers.

### Stewards:

- Three Bays Preservation, Inc. (publishes The Three Bays Monitor) ([www.3bays.org](http://www.3bays.org))
- Barnstable Land Trust
- Rivers 2000 (Barnstable High School)
- Wheeler Road Association and Friends
- Mashpee Sewer Commission
- B.A.R.S. (Barnstable Association of Recreational Shellfishing)
- K.U.S.P. (Keep Untamed Santuit Pond)
- Indian Ponds Association (Mystic Lake, Middle Pond, and Hamblin Pond)
- Marstons Mills River Committee

### Studies conducted in the watershed:

- Various sanitary surveys, conducted by the Division of Marine Fisheries.
- Diagnostic/Feasibility Study of Hamblin's Pond, Barnstable, Massachusetts. July 1993. Baystate Environmental Consultants, Inc: East Longmeadow, Massachusetts.
- Cape Cod Coastal Embayment Project – A Nitrogen Loading Analysis of the Three Bay System. 1998. Cape Cod Commission.

- Water Quality & Habitat Health of the Three Bays Estuarine System: Progress Report from the 1999 Field Season. Fall 2000. Three Bays Preservation, Inc.
- Ropes Beach Subwatershed Assessment.
- A Stewardship Plan for the Marstons Mills River Reserve. Barnstable Land Trust.
- Phase II Priority Land Acquisition Assessment Project conducted by the Cape Cod Commission. March 2001. Barnstable Property Tracts 7 and 23 were evaluated for their suitability for future water supply sites.
- Cape Cod Atlas of Tidally Restricted Salt Marshes. 2001. Cape Cod Commission.
- The Three Bays System was selected as a priority area for the Estuaries Project – Southeastern Massachusetts Embayment Restoration, funded by the state and UMass Dartmouth. The goal of the project is to develop critical nutrient loading thresholds for each embayment to aid in water resources planning. The thresholds will support federal requirements for the development of Total Maximum Daily Loads for impaired surface waters. This area will be evaluated in 2002.
- Feasibility Study for Improving Flushing in Rushy Marsh Pond. 2002. Town of Barnstable.

#### Who is collecting water quality data and where:

- Three Bays Preservation, Inc.  
Analyze water samples primarily for presence of nutrients and fecal coliform in addition to some physical measurements. Conducted DNA testing to identify the animal or human source of fecal coliform. Collect water samples at 21 sites on North Bay, Cotuit Bay, Nantucket Sound, West Bay, Prince's Cove, Warren's Cove, Seapuit River, Eel River, Marstons Mills River, Middle Pond, and Mystic Lake.
- Wheeler Road Association and Friends  
Middle Pond, Mystic Lake
- Barnstable Land Trust [Rivers 2000 (Barnstable High School)]  
Marstons Mills River, Prince's Cove
- Town of Barnstable Department of Public Works (coordinated through Three Bays Preservation)  
Physical – total depth, Secchi depth, temperature, oxygen content, salinity, waterbody state (a subjective observation of general conditions), weather, wind speed, and direction.  
Laboratory analyses – nitrate and nitrite, ammonium, dissolved organic nitrogen, chlorophyll, orthophosphate.
- The United States Geological Survey maintains stream flow gauges in the Marstons Mills River and Little River, collecting data that will be used in the Massachusetts Estuaries Project.

#### Management actions taken:

- Dredging projects conducted by Three Bays Preservation. Winter of 2001/2002 dredging removed 9,500 cubic yards of sand from the Cotuit entrance channel to improve navigation and flushing. Deposited on Sampson's Island, creating two acres of new bird habitat.
- Massachusetts Division of Fisheries and Wildlife stocks Hamblin, Lovell's, and Peters Ponds with rainbow, brook, and brown trout. Marstons Mills River is annually stocked with brook trout.
- Road runoff treatment at intersection of 149 and 28 on Barnstable Trust Land, 1997.
- Three-Bay Area-Ropes Beach Stormwater Demonstration. Capture and treat road runoff that is contributing to the contamination of Cotuit Bay to remove sediment, bacteria, and nitrogen. Project completed in 1999 (319 Grant Program).
- The Town of Sandwich prohibited engines larger than 15 horsepower from Lawrence and Triangle Ponds.

- Town of Barnstable broadcasted 236,900 two year old quahogs on the Southside in the summer of 2001.
- Town of Barnstable is participating in Southeastern Massachusetts Aquaculture Center's scallop restoration project with the goal of populating Barnstable embayments with bay scallops by establishing broodstock sanctuaries.
- The Town of Barnstable is applying for State Revolving Fund (SRF) funds for a Nutrient Management Planning Project. This is a comprehensive project to manage wastewater, stormwater, and fertilizer loadings that are causing nutrient and other water quality related problems to the town's coastal and fresh waterbodies. Project area includes the entire Town of Barnstable, Shoestring Bay recharge area of the Popponesset Bay Watershed, Three Bay Subwatershed, Centerville River/East Bay Subwatershed, and Barnstable Harbor Subwatershed.
- Town of Barnstable is participating in the DEP Estuaries Project, a comprehensive evaluation of embayments in Southeastern Massachusetts that uses citizen water quality monitoring and water quality modeling of the embayments to evaluate nitrogen removal strategies in the embayment watershed. The Three Bays estuary is included in the first group of 20 embayments that will be studied.

**Subwatershed facts:** (For data sources see the Appendix)

- 21 E sites: none
- Solid waste sites: 2
- Zone IIs located in this watershed: approximately 8
- Interim Wellhead Protection Areas (IWPAs): 18
- Percent of the undeveloped land that is protected (according to 1985/1990 data): 16%
- Acres of existing wetlands: 220
- Certified vernal pools: 2
- Named freshwater ponds: Parker, Neck, Lewis, Dam, Bog, Eagle, Lovells, Mill, Pattys, Long, Muddy, Hamblin, Middle, Little (*Barnstable*), Lawrence, Upper Hog, Lower Hog, Triangle, Peters (*Sandwich*), Santuit (*Mashpee*) Mystic Lake (*Barnstable*)
- Named rivers or creeks: Little, Seapuit, and Marstons Mills
- 1998 Massachusetts 303(d) List of Impaired Waterbodies: Prince's Cove, including adjacent unnamed cove to the mouth at Fox Island – pathogens.
- Beach closures: Hamblin and Lawrence Ponds were each closed to swimming for at least one day during the 2001 season due to high enterococcus bacteria counts.
- Shellfish growing areas: North Bay and Prince's Cove are conditionally approved, West and Cotuit Bays are approved for shellfish harvesting.
- This watershed contains Natural Heritage and Endangered Species Program (NHESP) Estimated Habitats of Rare Wildlife.

**Priorities:**

- Develop critical nutrient loading thresholds for the Three Bay System to aid in water resources planning and the development of TMDLs. This effort is underway as part of the Estuaries Project.
- Develop short and long-term implementation plans to address the nitrogen problems in the Three Bays area.
- Implement BMP on storm drain on Route 28 and Prince Avenue. Work with Massachusetts Highway Department to correct. (NRCS)
- Learn the cause of the red tide algal bloom during the Fall of 2001 in North Bay and Princes Cove.

- Address eutrophication and algal blooms in Prince and Turtle Coves.
- Restore upland habitat and develop and maintain an interpretive trail on the Mary Barton property (a Land Trust property) on Old Post Road at Eagle Pond.
- Develop a management plan for the Middle Pond Herring Run.
- Rehabilitate herring run on the Marstons Mills River at Mill Pond. Repair concrete and stonewall on the herring run outfall structure from Mill Pond, replace 350 feet of the wooden flume, and stabilize and improve the east bank of the run south of Route 28.
- Reduce aquatic weed population on Mill Pond in Marstons Mills.
- Continue water quality monitoring on Hamblin Pond following the alum treatment that was completed in 1995.
- Shubal, Long, Muddy, Patty's, Hog, and Triangle Ponds need volunteers to participate in the Pond and Lakes Stewardship Project (PALS), measuring water quality and other characteristics of the ponds.
- Develop management plan for Middle Pond.
- Implement Lovell's Pond Restoration Project: Bottom Layer Aeration.
- Acquire open space. Parcels considered a priority for acquisition for water supply protection and development: Barnstable Tracts 2, 3, 4, 5, 7, 14, 16, 17, 19, 21, 24, 26, 27, 29, 31, 35, 37, 41, 43, 45, 48, 49, 53, 55, and 56 were ranked as having medium or high water supply development potential in the Cape Cod Commission's *Priority Land Acquisition Assessment Project* (April 1999). These tracts are located throughout the town of Barnstable.

#### Recreation:

##### Camping areas:

- Peters Pond Park
- Camp Lyndon

##### Golf courses:

- Oyster Harbors Club
- Holly Ridge Golf Club
- Ridge Club
- Wianno Club Golf Course

##### Parks & trails:

- Burgess Park
- Lowell Park
- Marstons Mills River Preserve
- [www.capecodcommission.org/pathways/trailguide.htm](http://www.capecodcommission.org/pathways/trailguide.htm)

##### Public access:

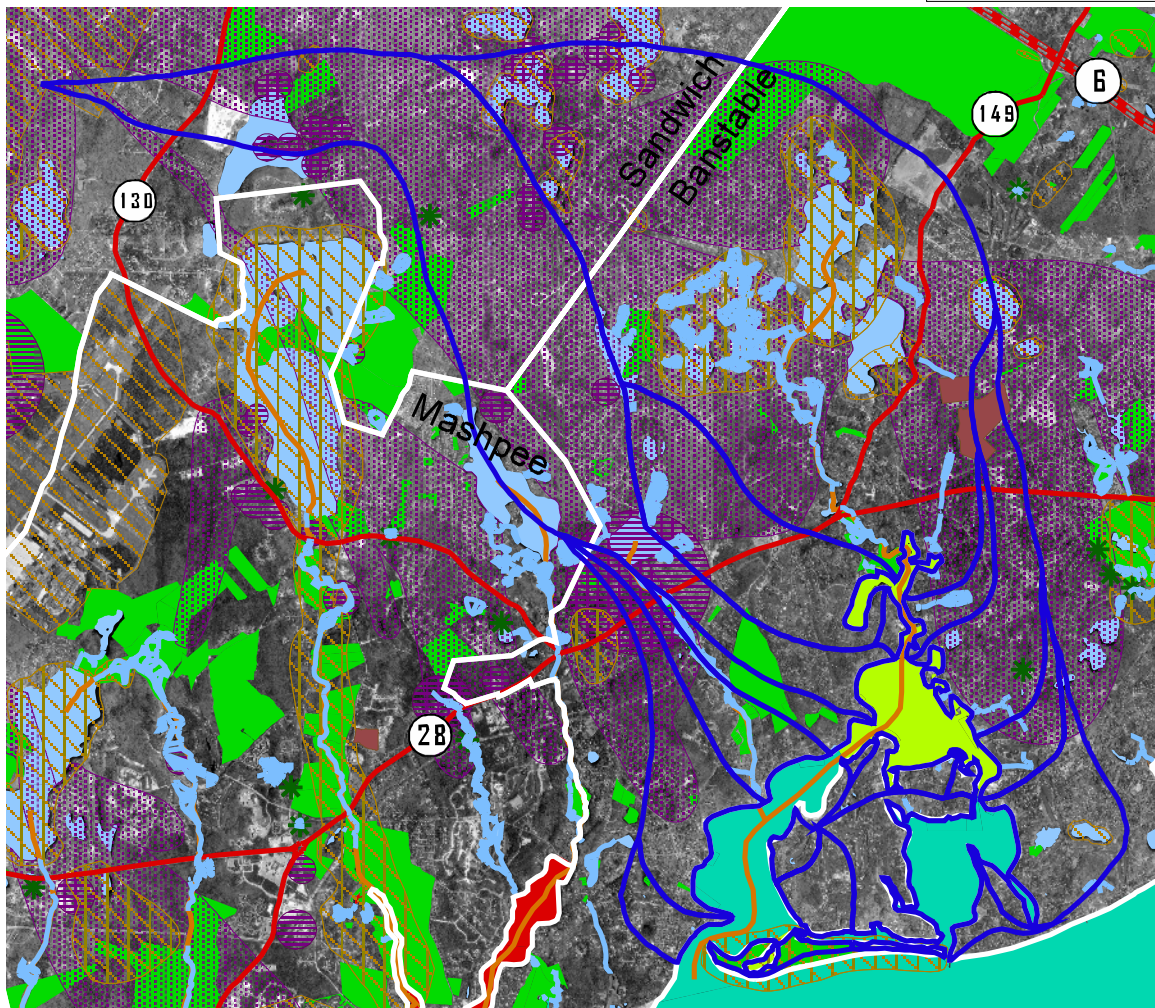
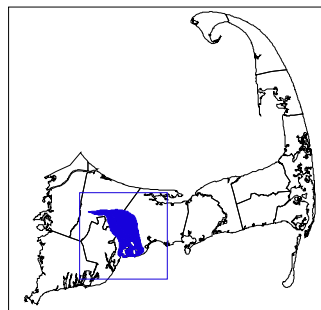
- <http://www.state.ma.us/dfwele/pab/pabSEmap.htm>

##### Beaches and town landings:

- Landings on Mystic Lake (2 landings), Middle Pond, Hamblin Pond, Lovells Pond, Prince's Cove, North Bay (2 landings), Cotuit Bay (3 landings), West Bay
- Loop Beach
- Wianno Yacht Club Beaches on Lovells and Hamblin Pond

# Three Bay System

Barnstable and Sandwich, MA



## Watershed Resources



0 0.5 1 1.5 2 Miles

### Natural Heritage and Endangered Species Program Data

- Certified Vernal Pool
- Priority Habitats of Rare Species
- Estimated Habitats of Rare Species

### Groundwater Protection Areas

- Interim Wellhead Protection Area
- Zone II
- Solid Waste Facility

Watershed Boundary

Anadromous Fish Run

### Shellfish Growing Areas

- APPROVED
- CONDITIONALLY APPROVED
- MANAGEMENT CLOSURE
- PROHIBITED
- RESTRICTED

Open Space

Streams

Ponds

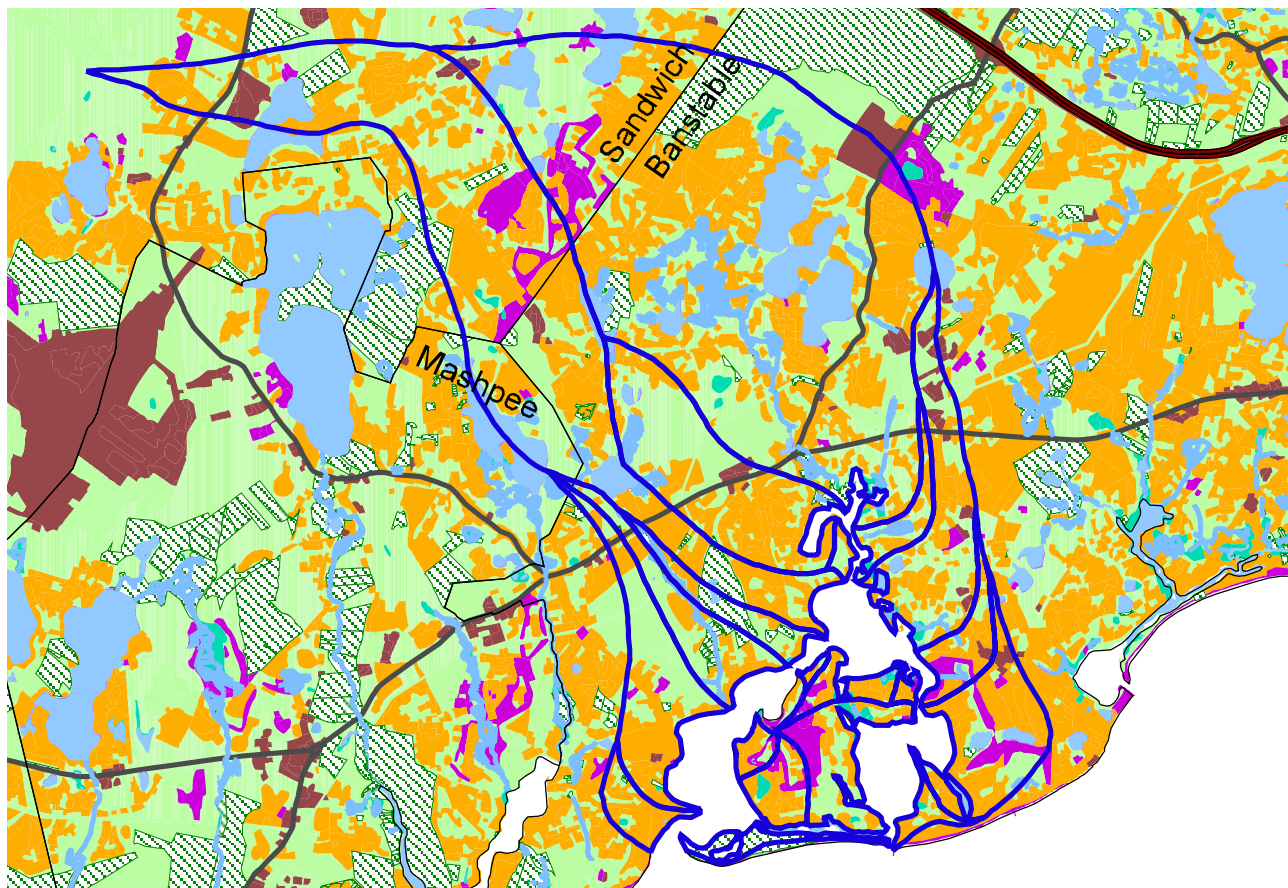
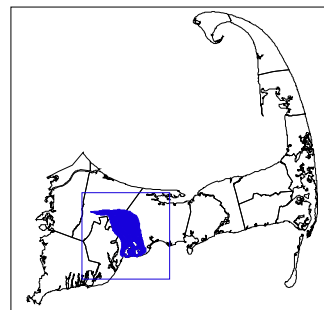
Roads





# Three Bay System

Barnstable and Sandwich, MA



## Land Use



0 0.5 1 1.5 2 Miles

## Land Use

- non-residential developed
- open land
- recreation
- residential
- water
- wetland

- Streams
- Ponds
- Watershed Boundary
- Protected Open Space

